

REMARKS

Claims 15-27 are pending. Claims 1-14 have been cancelled.

The new claims are replacements for claims 1-14 (except for claim 8) but do not include the reference to "high-molecular," as rejected by the Examiner. The claims also include new features, such as a more specific recitation of the components of the claimed rubber and the recitation of the way the component (a) of the claimed rubber is made. The new claims are also in better form. Support for the new claims can be found in, for example, the claims as filed and in US2007/0155889 ("published application") at paragraphs [0077] - [0078].

Claim 11 has been rejected as indefinite. The Examiner's position is that the term "high-molecular substance" is indefinite. Without prejudice, the term "high-molecular" has been removed and replaced with the term "first substance." Such term has been replaced in all of the claims, not just claim 11.

Claims 1-14 are rejected as obvious over JP 56109205 (Takeuchi et al.) in view of U.S. Patent No. 6,350,807 (Blok et al.) and JP 2000044633 (Nakamura et al.). The Examiner alleges that Takeuchi et al. discloses a rubber composition and a tire made from the rubber composition, containing a 2-40% content of a 1,2-polybutadiene with a melting point of 180-220°C, and a cis-1,4-polyisoprene or natural rubber, and cites to the claim of Takeuchi et al. for support. The Examiner also alleges that the 1,2-polybutadiene is finely dispersed in the cis-1,4-polybutadiene or natural rubber matrix and cites to the first paragraph on page 10 in the translation for support. Additionally, the Examiner alleges that the rubber can be blended with natural rubber or isoprene rubber for tire applications and cites to Table 3, Working Example 3, the second paragraph on page 10 of the translation, and the first paragraph on page 3 of the translation.

Although the Examiner acknowledges that Takeuchi et al. does not disclose the silica to be added nor the fiber form of the polybutadiene, the Examiner concludes that it would have been obvious to modify Takeuchi et al. to include silica and to have polybutadiene in fiber form in view of Blok et al. and Nakamura et al. Thus, for the above and other reasons, the Examiner

concludes that the claims of the present application would have been obvious over Takeuchi et al. in view of Blok et al. and Nakamura et al. Applicants respectfully but strenuously traverse the rejection of claims 1-14 for the reasons set forth below.

Claims 1-14 (except for claim 8) have been replaced by claims 15-27, which will be the focus of the following arguments. Claim 15, recites that the rubber composition comprises a rubber component including (a) and (b), where (a) is a vinyl-cis-polybutadiene rubber comprising 1,2-polybutadiene, a cis-polybutadiene rubber, and a first substance which comprises at least one selected from the group consisting of polyisoprene, crystalline polybutadiene having a melting point not higher than 150°C, liquid polybutadiene, and derivatives thereof, and where (b) is a diene-based rubber different from (a). Also, claim 15 recites that the rubber composition also comprises a rubber reinforcing agent (c). Additionally, claim 15 recites that (a) is produced by subjecting 1,3-butadiene to cis-1,4-polymerization in a hydrocarbon-based solvent by using a cis-1,4-polymerization catalyst, subsequently subjecting 1,3-butadiene to 1,2-polymerization, and then separating, recovering, and obtaining the vinyl-cis-polybutadiene rubber composition, and further comprising adding the first substance during the production of the vinyl-cis-polybutadiene rubber. Additionally, claim 15 recites that the 1,2-polybutadiene is a short crystalline fiber and that an average minor axis length of monodispersed fiber crystals is not more than 0.2mm, an aspect ratio is not more than 10, and the number of average monodispersed fiber crystals is 10 or more per 400 μm^2 .

Thus, as is clear from the above, claim 15 requires the presence of a cis-polybutadiene rubber. Applicants have found no such disclosure in Takeuchi et al. Although the Examiner alleges on page 2 of the Office Action that “the 1,2-polybutadiene is finely (micro) dispersed in the cis-1,4-polybutadiene or natural rubber matrix (first paragraph on page 10 in translation)” (emphasis added), Applicants respectfully point out that the first paragraph on page 10 of the translation of Takeuchi et al. discloses that “there is a micro dispersion of syndiotactic 1,2-polybutadiene with a high melting point in the cis-1,4-polyisoprene or the natural rubber matrix” (emphasis added). Thus, while Takeuchi et al. discloses cis-1,4-polyisoprene, it fails to disclose the presence of any cis-polybutadiene rubber. The reliance upon Blok et al. and Nakamura et al.

for the use of silica or for the fiber form of polybutadiene does not cure the deficiencies mentioned above. Accordingly, claim 15 is patentable over Takeuchi et al. in view of Blok et al. and Nakamura et al.

Furthermore, claim 15 recites that the first polymerization step to produce the vinyl-cis-polybutadiene rubber composition (a) involves the use of a cis-1,4-polymerization catalyst, which facilitates a cis-1,4-polymerization of 1,3-butadiene. No such step is disclosed or suggested in Takeuchi et al., which is specifically directed to performing a 1,2 polymerization of butadiene. In fact, on the third full paragraph of page 8 of the translation of Takeuchi et al., it is disclosed that the catalyst used is a 1,2 polymerization catalyst. Thus, the product of the claimed invention is different from the product of the invention of Takeuchi et al., since the invention of Takeuchi et al. fails to disclose the use of a cis-1,4-polymerization catalyst, as recited in claim 15. The reliance upon Blok et al. and Nakamura et al. for the use of silica or for the fiber form of polybutadiene does not cure the deficiencies mentioned above. Accordingly, claim 15 is patentable over Takeuchi et al. in view of Blok et al. and Nakamura et al.

Additionally, as stated above, Takeuchi et al. specifically discloses that it is directed to a composition where 1,2-polybutadiene is dispersed in a cis-1,4-polyisoprene matrix. In contrast, the matrix of the present invention is a cis-polybutadiene matrix, as is clear from the Figs. of the present invention and the corresponding descriptions in the specification. Thus, the matrix of the present invention is made of a different material than that of Takeuchi et al. and this further distinguishes the present invention over Takeuchi et al. The reliance upon Blok et al. and Nakamura et al. for the use of silica or for the fiber form of polybutadiene does not cure the deficiencies mentioned above. Accordingly, claim 15 is patentable over Takeuchi et al. in view of Blok et al. and Nakamura et al.

Furthermore, although the Examiner alleges that the dispersion of the 1,2-polybutadiene in Takeuchi et al. is a microsize dispersion, Takeuchi et al. does not disclose or suggest that the dispersibility is good. The present invention, in contrast, is directed to a novel rubber

composition where the 1,2-polybutadiene shows nanosize dispersion with extremely high dispersibility.

Also, claim 15 recites a minor axis average length of monodispersed fiber crystals of not more than 0.2 μm , an aspect ratio of not more than 10, and 10 or more average fiber crystals per 400 μm^2 . Takeuchi et al. fails to disclose or suggest these features. The Office Action has not demonstrated that the reliance on Blok et al. and Nakamura et al. cures this deficiency in Takeuchi et al. Thus, claim 15 is patentable over Takeuchi et al. in view of Blok et al. and Nakamura et al. Moreover, Nakamura et al. fails to use polyisoprene for increasing the dispersibility of 1,2-polybutadiene, and there is no indication that the dispersibility in Nakamura et al. is as good as in the presently claimed invention. In Sample 2 of the present specification, no first substance is used, in contrast to Sample 1, and the results shown in Tables 1 and 2 of the present specification demonstrate that this results in property differences between Samples 1 and 2, which show the superiority of the present invention.

Although Blok et al. is directed to a rubber composition which includes silica, there is no disclosure of the die swell and fuel efficiency of the invention of Blok et al. being comparable to the claimed invention, which has a good balance of both of these characteristics. Thus, this further supports the patentability of the present invention.

Thus, in view of the above, claim 15 is patentable over Takeuchi et al. in view of Blok et al. and Nakamura et al., and notice of this effect is respectfully requested. Claims 16-19 depend from claim 15 and are patentable at least for the reason that they depend from a patentable base claim.

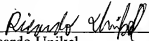
Claims 20 and 23-27 include the features described above regarding claim 15 and are patentable at least for the same reasons as claim 15, as explained above. Claims 21 and 22 depend from claim 20 and are patentable at least for the reason that they depend from a patentable base claim.

CONCLUSION

In view of the foregoing Amendments and Remarks, Applicants respectfully submit that the claims are in proper form and distinguish over the cited art. Therefore, the present application is in condition for allowance. Reconsideration and an early Notice of Allowance are respectfully requested

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Respectfully submitted,

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